Physics

FREQUENCY STABILIZATION OF A SELF-CONTAINED HELIUM NEON LASER

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Small self-contained helium neon gas lasers are widely available, but their application, for example to the Doppler measurement of speed, is limited by the fact that their frequency steadily drifts as the laser warms up. We investigated whether previous laser stabilization procedures based on wrapping a heater directly onto a glass laser tube would be extended to the case of a heater wrapped around the metal housing of a commercial self-contained lasers. Active optical feedback was achieved by monitoring the laser power, an indicator of laser frequency, with a photoresistor. The photoresistor controlled the gain of an inverting operational amplifier, which, in turn, controlled the power delivered to the heater. By using the new circuit, the laser was stabilized in a relatively short time period, and we can tune between single-mode and two-mode operation. A laser frequency stabilization method previously applied only to a bare laser plasma tube can also be made to work for a commercial self-contained laser enclosed in a metal housing.